

WHAT IS CLAIMED IS:

1. An optical connector device, comprising:
 - a two-dimensional optical waveguide layer;
 - a semiconductor laser having a function capable of switching a plurality of different oscillation modes; and
 - an optical path converting structure for converting an optical path of an outgoing light from the semiconductor laser,
- 10 wherein the optical path converting structure is disposed within the two-dimensional optical waveguide layer such that a radiation angle of the semiconductor laser changes within the two-dimensional optical waveguide layer upon switching over the oscillation mode of the semiconductor laser, and the outgoing light from the semiconductor laser propagates in the two-dimensional optical waveguide layer.
- 20 2. An optical connector device according to claim 1, wherein the semiconductor laser is a vertical cavity surface-emitting laser formed with a current constricting layer in a vicinity of an active layer composing the semiconductor laser.
- 25 3. An optical connector device according to claim 2, wherein the oscillation mode of the vertical

cavity surface-emitting laser is switched by control
of at least one of a shape of an aperture (current
path) of the current constricting layer and an
injection current amount of the vertical cavity
5 surface-emitting laser.

4. An optical connector device according to
claim 3, wherein the control causes a change in a
radiation angle of a far-field image of the
10 semiconductor laser.

5. An optical and electrical circuit combined
board, comprising the optical connector device
according to claim 1 formed so as to obtain
15 electrical connection with an electrical circuit
board,

wherein a part of or whole signals from the
electrical circuit board are transmitted by optical
circuit as transmission of optical signals using the
20 optical connector device.